Transactions of the First (Cont.) SOV/1140

Khmel'nitskiy, Yu.L., Proskurnin, M.A., Barelko, Ye.V., Melekhonova, I.I. and Slepneva, A.T. Oxidation of n-Hexadecane Under the Influence of Co^{60} Gamma Radiation 240

Vereshchinskiy, I.V. and Bakh, N.A. The Effect of Ionization Density on the Radiolysis of Hydrocarbons 245

Vereshchinskiy, I.V., Karpushkin, L.T. and Shcheglov. Synthesis of Leuco-Compound Dyes By the Action of Co^{60} Gamma Radiation 249

Discussion (By contributing authors and O.V. Chebotarev, I.A. Kazarnovskiy, A.N. Pomanskiy, Kh.S. Bagdasar'yan, M.A. Besprozvannyy)

PART VI. THE EFFECT OF RADIATION ON POLYMERS

Slovokhotova, N.A. Investigation of Chemical Changes Which Take Place in Several Vinyl Polymers Under the Action of Ionizing Radiation 263

Card 12/15

SOV/1140

Transactions of the First (Cont.)

Pravednikov, A.N. and Medvedev, S.S. The Formation of Side Chains With the Irradiation of Polyethlenes by Ionizing Radiation 269

Zverev, B.I., Karpov, V.L. and Leshchenko, S.S. Processes of Phase Transformations in Polymers Under the Action of Nuclear Radiation 274

Petrov, I.Ya. and Karpov, V.L. Investigation of Gas-emission Processes In the Action of Nuclear Radiation on Polymers 279

Tsetlin, B.L., Zaytseva, N.G., Korbut, V.M. and Kargin, V.A. Principles of the Disintegration of Vitreous Polymers by Radiation 285

Taubman, A.B. and Yanova, L.P. The Role of Gas-formation in the Disintegration of Polymers by Radiation 287

Nikitina, T.S., Kuz'minskiy, A.S., Oksent'yevich, L.A. and Korpov, V.L. Radiation Vulcanization of Rubber 292

Card 13/15

Lazurkin, Yu.S. and Ushakov, G.P. The Effect of Radiation on the Properties of Silicone Resins 297

Tarasova, Z.N., Kaplunov, M.Ya. and Dogadkin, B.A. Structure and Properties of Vulcanized Rubbers Obtained by the Action of Nuclear Radiation 298

Discussion (By contributing authos and N.A. Slovokhtova, S.V. Aver'yanov, Ye.V. Zyuravskaya, and B.L. Tsetlin)

PART VII. SOURCES OF RADIATION

Zatulovskiy, V.I., Vitushkin, N.I., Naryadchikov, D.I. and Petrovskiy, V.I. Sources of Ionizing Radiation for Radiation-chemical Research 313

Ryabukhin, Yu.S. and Breger, A.Kh. Modeling Isotope Sources of Radiation for Potential Industrial Radiation-chemical Installations. I. Investigation of Dosage Fields in the Operational Chamber of Apparatus K-1400 318

Glazunov, F.Ya. and Kuz'min, M.G. Obtaining Electron-impulse Radiation in a Straight Accelerator Tube	324

AVAILABLE: Library of Congres (QD601.A1V82,1., 1957)

TUNITSKIY, N.N.

5(2) PHASE I BOOK EXPLOITATION SOV/1727

Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii

Redkozemel'nyye elementy; polucheniye, analiz, primeneniye (Rare Earth Elements; Extraction, Analysis and Application) Moscow, Izd-vo AN SSSR, 1958. 331 p. 2,200 copies printed.

Resp. Ed.: D. I. Ryabchikov, Professor; Editorial Board: I. P. Alimarin, Corresponding Member, USSR Academy of Sciences, I. N. Zaozerskiy, Doctor of Chemical Sciences, R. V. Koglyarov, Candidate of Technical Sciences, V. I. Kuznetsov, Doctor of Chemical Sciences, M. M. Senyavin, Candidate of Chemical Sciences, and Yu. S. Sklyarenko, Candidate of Chemical Sciences; Eds. of Publishing House: D. N. Trifonov and T. G. Levi; Tech. Ed.: S. G. Markovich.

PURPOSE: This book is intended for scientists, chemists, teachers and students of higher educational institutions, chemical and industrial engineers, and other persons concerned with the extraction, preparation, use, or study of rare earth elements.

COVERAGE: This collection contains reports presented at the June 1956 Conference on Rare Earth Elements at the Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences USSR. The articles treat chemical methods of separating rare earth mixtures, methods of processing rare earth ores, ion exchange chromatography, chemical analysis, and some industrial applications of rare earths. Aside from contributing authors, the editors mention the following Soviet scientists, who are studying rare earth elements, rare earth deposits, extraction methods, and the preparation of oxides and salts: Martynov, Mel'nikov, Khrushchev, Melikov, Pisarzhevskiy, Chernyak, Tananaev, Belousov, Knukov and especially, N. A. Orlov, who first obtained the majority of rare earth elements in the pure state, separated many complex molecular compounds of these elements, and determined their specific properties. References are given at the end of each article.

TABLE OF CONTENTS:

ESK 121

[illegible], Ye. F., N. N. Tunitskiy, and V. V. Nekrasov (Fiziko-khimicheskiy institut imeni L. Ya. Karpova [Institute of Physical Chemistry imeni L. Ya. Karpov]). Separation of Rare Earth Elements by the Countercurrent Chromatographic Method 129

Kolosova, G.M., and M.M. Senyavin (Institute of Geochemistry and Analytical Chemistry imeni V.I. Vernadskiy AS USSR). Separation of Rare Earth Elements in Anionites 138

Sklyarenko, S. I., L.E. Krauze, and V.A. Morozova. Comparative Evaluation of Electrochemical Methods of Preparing Ytterbium 143

Troitskiy, K. V. (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy AS USSR), Study of a Method of Separating Radio Isotopes in Paper Filters in Order to Prepare Ce^{144} Without a Carrier 151

Card 6/11

(9)

TUNITSKII, N.N.

AUTHORS: Tunitskiy, N. N., Nekrasov, V. V., Cherneva, Ye. P. 78-1-13/43

TITLE: The Theory of the Separation of Rare Earths by Means of Chromatographical Methods (Teoriya razdeleniya redkozemel'nykh elementov khromatograficheskim metodom).

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 1, pp. 66-73 (USSR).

ABSTRACT:

Results of the application of statistical methods with respect to the theory referred to in the title are described in the present report, and theoretical results are compared with the experimental ones. Washing out of chromatographic apexes of curves. The efficiency of separation of the ions of two elements depends 1st on the static factors of separation (ratio of the coefficients of sorption of the ions) and secondly on kinetic factors. The coefficients of diffusion D_c (in the grains of the adsorbent) and D_p (in the solution) are described by means of equations (1). These coefficients of autodiffusion were measured in several elaborate investigations. The velocity of diffusion of the rare earths in sulfopolystyrene-resin KU-2 was measured by the authors. D_c is equal to 10^{-8} cm^2/sec. If Dc is known, the part of the

Card 1/5

washing out which is caused by the diffusion processes in the river, can be determined. This part is expressed by the second and third term of the equation:

$$K = \frac{R^2 v^2}{15 D_c \Gamma^2} + \frac{\delta v^2}{S D_p \Gamma} + \frac{D_{long}}{\Gamma} \quad (3),$$

in which case R - is the radius of the particles, v - the velocity per 1 cm^2 of the cross-section, $\Gamma = \gamma(1 - \chi)$, γ - the coefficient of sorption with respect to the unit of volume in the interior of the grain of sorbent, δ - the thickness of the effective thin film of diffusion in the solution, S - the specific surface of the sorbent and $D_{long.}$ (D_{pr}) - coefficient of the longitudinal diffusion. For univalent elements, and when using HCl as rinsing solution, it was found that the part K which depends on the processes in the solution, is approximately proportional to "v". (reference 4). Then,

$$K = \frac{R^2}{15 D_c \Gamma^2} - v^2 + \frac{CR}{\Gamma} v \quad (3').$$

The washing out of the apex consequently consists of 2 parts. The first part depends on the inner diffusion in the grains of sorbent and is proportional to $\frac{v^2}{\Gamma^2}$. The second part depends on the processes in the flowing solution and is approximately proportional to $\frac{v}{\Gamma}$. Other kinetic factors can also be seized with the same method. The equation (3) can be directly applied in the cases where the distribution of ions is considered in the length of the column. Experimental investigation of the apexes. For experimentally re-examining the equation:

$$\frac{(\Delta V^2)}{\bar{V}} = a_1 + b_1 v \Gamma^2 \quad (7)$$

which was derived by applying (3'), the washing-out of the apexes of Rb^{86}, which was achieved by rinsing of the column with "Espatite-1"-resin by 0,1 n HCl (reference 1) was investigated. The tests confirmed the theoretically required dependence of the width of the band on the length of the column and proved the correctness of the equation (7). The results of one of the tests are shown in table 1 and figure 1. A diagram was drawn of the results of each test (figures 1, 2). Investigation of the kinetics of the ion-exchange of rare earths. The above investigation does not yet permit to draw any definite conclusions on the role of individual kinetic factors with the separation, and on the influence of the complex-former. As is generally known, the apexes of rare earths are largely expanded with the decreasing pH of the solutions of citric acid. The kinetics of desorption of several elements in 5°/o solution of this acid with different pH (adjusted with ammonia) were investigated for clarifying these problems (reference 5). The values of the coefficients of diffusion of the ions of rare earths within the resin-grains (D_c) were computed from the curves of desorption. The found constancy of the D_c-values confirms the mechanism of diffusion of the desorption. It is shown in table 3 that the average values of these coefficients are independent on the composition of the solution. It hence results that the complex-former has no specific effect with low pH. It results from table 4 in which the dependence of the coefficients of diffusion on the pH for La^{140} and Eu^{154} are reproduced that D_c increases to some extent with increasing pH. The washing out of the apexes is mainly explained by processes in the solution. Table 5 shows the influence of the atomic number on the value of the coefficient of diffusion. The heavy rare earths diffuse many times more rapidly in resin than do the light. The conditions of separation. An increase of the coefficient of sorption prolongs the duration of separation and viceversa. There are 3 figures, 5 tables, and 7 references, 5 of which are Slavic.

78-1-13/43

The Theory of the Separation of Rare Earths by Means of Chromatographical Methods.

ASSOCIATION: Scientific Physical-Chemical Research Institute imeni L. Ya. Karpov MKhP (Ministry of Chemical Industry) USSR (Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni L. Ya. Karpova MKhP SSSR).

SUBMITTED: May 19, 1957.

AVAILABLE: Library of Congress.

Card 5/5

57-28-4-32/39

AUTHORS: Tunitskiy, N. N., Devyatykh, G. G., Petrov, P. S., Torlin, B. Z.

TITLE: The Separation of Carbon Isotopes by the Thermodiffusion of Carbon Monoxide (Razdeleniye izotopov ugleroda termodiffuziyey okisi ugleroda)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 4, pp. 881--885 (USSR)

ABSTRACT: The investigations described here had already been terminated in 1953, when reference 9 was published. - The separation of carbon isotopes by means of the thermal diffusion of carbon monoxide in glass towers with a diameter of 9 and 14,5 mm, a length of 1 and 2 m with a platinum wire of 0,4 - 0,6 mm diameter as a heating-element were investigated here. The experimental results are in agreement with the theory by Dzhons (Jones ?) - Ferri - Onsager. - It is shown that in a number of cases the use of carbon monoxide as working gas has certain advantages as compared to the use of methane. The ratio of the separating factor of carbon to that of oxygen differs from the theoretical value. The latter is equal to 2. The magnitude of the deviation depends on the steam-content

Card 1/2

The Separation of Carbon Isotopes by the Thermodiffusion of Carbon Monoxide 57-28-4-32/39

in the gas.
There are 5 figures, 3 tables, and 12 references, 3 of which are Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva (Moscow, Physical-Chemical Institute imeni L. Ya. Karpov)

SUBMITTED: April 17, 1956

Card 2/2

76-32-6-40/46

AUTHORS: Cherneva, Ye.P., Pashkov, A.B., Barabanov, S.R., Tunitskiy, N.N.

TITLE: The Effect of the Capacity of **Sulphostyrene** Cationites on the Ion-Exchange Equilibrium (O vliyanii yemkosti sul'fostirol'nykh kationov na ionoobmennoye ravnovesiye)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 6, pp. 1423-1424 (USSR)

ABSTRACT: The problem of the influence of the capacity of the ionites on their selectivity is insufficiently investigated as, e. g. the assumption of the paper by Bauman (Ref 1) was not verified, and in the experiments conducted by Boyd (Ref 3) besides the structural change also a chemical change of the composition of the cationites may have taken place. In order to avoid the disadvantages of the **desulphurization** method in the investigation of the selectivity the authors synthetized highly acidous **sulphostyrene** cationites of a different content of sulfo groups and interchain-bonds according to the method of direct **sulphurization**. The equilibria Na-H, K-H and Ca-H were investigated with 0,1 n solutions and samples having been used; the selectivity of the exchange was

Card 1/2

The Effect of the Capacity of Sulphostyrene Cations on SOV/76-32-6-40/46
the Ion-Exchange Equilibrium

determined according to an equation. From the mentioned data of the experiments may be seen that the assumption can be made that the selectivity of Rb and Na in resins of small capacity is smaller than in those of high capacity. The experiments carried out with the equilibrium Ca-H also showed that with the increase of the capacity of the resin also the selectivity increases. The individual values as well as the corresponding resin compositions are given. There are 4 references, 1 of which is Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva
(Institute of Physics and Chemistry imeni L.Ya. Karpov, Moscow)

SUBMITTED: October 9, 1957

1. Gases--Condensation 2. Gases--Decomposition 3. Mathematics

Card 2/2

5(4) SOV/76-32-12-31/32

AUTHORS: Gur'yev, M. V., Tikhomirov, M. V. and Tunitskiy, N. N.

TITLE: On the Mass Spectra of Large Molecules (O mass-spektrakh bol'shikh molekul)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 12, pp 2847-2847 (USSR)

ABSTRACT: For the purpose of investigating the dissociation processes in the case of an electron impact, mass spectra of n-nonane marked at a definite point with C^{13} (n-nonane-5C^{13}) were taken. By comparing them with the mass spectra of normal n-nonane the proportion of ions containing C^{13} was determined. The results can only be explained by assuming that the fragment ions form by a breaking of the binding between 2 carbon atoms. The molecule is broken in most cases into 3 fragments with C-atoms. The ions forming are strongly stimulated. Test results show that the stimulation energy of the initial ion, up to the moment of dissociation, can only spread to part of its degrees of freedom whereas H. Eyring (Ref 3) assumed a statistical distribution of

Card 1/2

On the Mass Spectra of Large Molecules SOV/76-32-12-31/32

the energy to all degrees of freedom. There are 1 table and 4 references, 1 of which is Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva (Physico-Chemical Institute imeni L. Ya. Karpov, Moscow)

SUBMITTED: May 25, 1958

Card 2/2

5(4) SOV/20-123-1-32/56

AUTHORS: Gur'yev, M. V., Tikhomirov, M. V., Tunitskiy, N. N.

TITLE: On the Mass Spectra of Large Molecules (O mass-spektrakh krupnykh molekul)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 1, pp 120-122 (USSR)

ABSTRACT: It is known that the bombarding of polyatomic molecules by electrons (energy 50-100 eV) leads to the ionization and dissociation of these molecules. In order to make it possible to draw unique conclusions concerning the mechanism of dissociation, the authors investigated the mass spectrum of n-nonane-5C^{13}. Carbon monoxide containing 51% C^{13} was used for the synthesis. The scheme for the synthesis is given. The nonane and n-nonane-5C^{13} mass spectra, which were corrected to their natural content of C^{13} and were determined under the usual conditions by means of the device MI-1303, are given in a table. A second table shows the percentages of the ions containing C^{13}. If the molecule of n-nonane-5 C^{13} were

Card 1/3

dissociated by a simple stripping of bonds, the ions of the type $C_2H_5^+$, $C_3H_7^+$, $C_4H_9^+$ would contain no carbon C^{13}. The fragment-like ions of other types are essentially formed by the stripping of hydrogen atoms from the original ions. In general, the dissociation of large molecules in an electron collision develops as follows: First, "head ions" ("golovnyye" iony) are produced with equal probability from all parts of the molecule (by the capture of a hydrogen atom) with an even number of ions. Next, some of these ions decay, accompanied by the stripping of hydrogen ions, and they form a complete mass spectrum of the substance. These facts correspond to the conclusions drawn from the investigations of the mass spectra from large molecules. At present the following is assumed: The excitation energy is distributed over the entire molecule after the electron collision and this molecule then dissociates according to the decay law. The authors from this point of view investigated 2 molecules of normal structure, as e.g. n-hexane C_6H_{14} and n-tetratetracontane $C_{44}H_{90}$. Contrary to expectations, the experiments showed the following: The larger the molecule (in the case of equal structure) the smaller will be

On the Mass Spectra of Large Molecules SOV/20-123-1-32/56

the content of molecular ions in its mass spectrum. Thus, the existence of even the mass spectra of large molecules must be explained by the fact that the energy transmitted by the electron cannot propagate over the entire molecule (before its dissociation). This supposition agrees with data concerning the investigation of initial ranges of ionization curves (Ref 7), and it makes it possible to explain the results obtained by the authors: If the electron incides with equal probability upon any part of the molecule, and if the energy transmitted by it is propagated before dissociation only within a small part of the molecule, it is just this part of the molecule that is "knocked out" in form of a fragment-ion. The ions produced in this way contain the main portion of the excitation energy and therefore dissociate easily accompanied with the stripping of hydrogen atoms. There are 2 tables and 7 references, 1 of which is Soviet.

PRESENTED: June 26, 1958, by V. A. Kargin, Academician

SUBMITTED: June 24, 1958

Card 3/3

SALDADZE, Kirill Maksimovich; TUNITSKIY, N.N., otv.red.; SENCHENKOVA, T.M., red.izd-va; UL'YANOVA, O.G., tekhn.red.

[Ion-exchanging resins] Ionoobmennye smoly. Moskva, Izd-vo Akad.nauk SSSR, 1959. 53 p. (MIRA 12:9)
(Resins, Synthetic) (Ion exchange)

Tunitskiy, N. N.

5(2), (3) PHASE I BOOK EXPLOITATION SOV/2554

Akademiya nauk SSSR. Otdeleniye khimicheskikh nauk. Komissiya po khromatografii

Issledovaniya v oblasti ionoobmennoy, raspredelitel'noy i osadochnoy khromatografii (Studies in the Field of Ion Exchange, Distribution and Precipitation Chromatography) Moscow, Izd-vo AN SSSR, 1959. 150 p. Errata slip inserted. 3,500 copies printed.

Ed. of Publishing House: N.G. Yegorov; Tech. Ed.: I.N. Guseva; Editorial Board: K.V. Chmutov, Corresponding Member, USSR Academy of Sciences (Resp. Ed.); F.M. Shemyakin, Professor; K.M. Ol'shanova, Professor; K.M. Saldadze, Docent, and N.N. Tunitskiy, Professor.

PURPOSE: This book is intended for chemists and chemical engineers.

COVERAGE: The book discusses studies in ion-exchange, distribution, and precipitation chromatography. Various problems of the theory of chromatography and its application are also considered. This is the 4th collection of articles published by the Committee on Chromatography. The first collection was published in 1952 under the title: "Issledovaniya v oblasti khromatografii" (Studies in the Field of Chromatography); the second was published in 1955 under the title "Teoriya i praktika primeneniya ionoobmennykh materialov" (Theory and Practice of the Use of Ion-exchange Materials); and the third was published in 1957 under the title "Issledovaniya v oblasti ionoobmennoy khromatografii" (Studies in the Field of Ion-exchange Chromatography). No personalities are mentioned. References are given after most of the articles.

Davydov, A.T. and G.M. Lisovina. Study of the Sorption Value and the Exchange Energy of Cations on Wofatite With Relation to Temperature 21

Rachinskiy, V.V. Theory of the Stationary Front of Dynamic Sorption 24

Saldadze, K.M., and Ye. N. Fedotova. Effect of the Ionite Structure on the Ion Exchange Process 39

Saldadze, K.M., and Ye. A. Sheynina. Kinetics of Cation Exchange Processes on Carboxylic Cationites 48

[illegible], L.R., and F.M. Shemyakin. Purification of Salts With the Aid of an Ion-exchange Counterflow Installation 55

Fedoseyeva, O.P., N.N. Tunitskiy, and Ye. P. Cherneva. Study of the Kinetics of Complete Cation Exchange on Sulfonated Resins 63

Cherneva, Ye. P., A. B. Pashkov, S.R. Barabanov, and N.N. Tunitskiy. Change in the Selectivity of Strongly Acidic Monofunctional Cationites in Relation to the Concentration of Sulfo Groups and Interchain Bonds in Cationites 70

Fedoseyeva, O.P., Ye. P. Cherneva, and N.N. Tunitskiy. Study of the Diffusion of Ions Through a Cationite Membrane 76

Shemyakin, F.M. Organic Reagents Used in Adsorption and Distribution Chromatography, Their Classification, and Trends of Investigation 80

Mitselovskiy, K.S., and F.M. Shemyakin. Some New Phenomena Which Accompany the Process of Electromigration of Organic Substances 90

Polyanskiy, N.G. Study of Thermal Desulfonation of Sulfophenolformaldehyde Resin KU-1 95

Kopylova, V.D., and K.M. Ol'shanova. Precipitation Chromatography 105

Kopylova, V.D., and K.M. Ol'shanova. Secondary Phenomena in Precipitation Chromatography 113

Ol'shanova, K.M., and N.M. Morozova. Determination of Calcium by the Precipitation Chromatography Method With the Indicator Murexide 124

Ol'shanova, K.M., and Z.A. Koloskova. Ion-exchange Paper Chromatography in Qualitative Analysis 128

Grigor'yeva, N.V. Chromatographic Method of Qualitative Analysis for Fur Dyestuffs 134

Saldadze, K.M., K.M. Ol'shanova, and I.I. Ivanova. Sorption of Mineral Acids and of Their Salts on Cationites 138

Gorbacheva, N.A., and K.M. Saldadze. Absorption of Complex Zinc Anions on Anionites With Different Basicity 143

Tunitskiy, N. N.

5(2) PHASE I BOOK EXPLOITATION SOV/2402

Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii

Redkozemel'nyye elementy; polucheniye, analiz, primeneniye (Rare Earth Elements; Production, Analysis, and Use) Moscow, Izd-vo AN SSSR, 1959. 331 p. 5,000 copies printed.

Resp. Ed.: D. I. Ryabchikov, Professor; Eds. of Publishing House: D. N. Trifonov and T.G. Levi; Tech. Ed.: S. G. Markovich; Editorial Board: I. P. Alimarin, Corresponding Member, USSR Academy of Sciences, I. N. Zaozerskiy, Doctor of Chemical Sciences, R. V. Kotlyarov, Candidate of Chemical Sciences, V. I. Kuznetsov, Doctor of Chemical Sciences, M. M. Senyavin, Candidate of Chemical Sciences, and Yu. S. Sklyarenko, Candidate of Chemical Sciences.

PURPOSE: This book is intended for chemists in general and for geochemists and analytical chemists in particular.

COVERAGE: This collection of articles consists of reports presented at the Rare Earth Elements Symposium held in June 1956 at the Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy. The book may be divided into three sections: the characteristics, uses and production of rare earth elements (REE); the methods of analyzing REE; and the application of individual rare earth elements and REE mixtures in the glass and metallurgical industries, and their use as catalysts. Considerable space is devoted to the application of ion-exchange chromatography in the production of pure forms of all rare earth elements. The combination of this method with other methods in separating REE on an industrial scale are discussed by D. I. Ryabchikov, Yu. S. Sklyarenko, and M. M. Senyavin. Chemical methods of separating REE compounds are discussed by I. N. Zaozerskiy (who is said to be the first in the USSR to develop methods of processing REE), V. P. Kotlyarov, L. F. Andreyeva, A. V. Nikolayev, and G. P. Aleksandrov. Quantitative X-ray spectral analytical methods are described by E. Ye. Vaynshteyn, and chemical methods of analysis by I. P. Alimarin and F. I. Pavlotskaya. The determination of REE impurities in pure products and atomic materials are discussed at length in these articles by A. N. Zaydel' and his associates. All articles are accompanied by photographs, diagrams, tables, and bibliographic references.

Martynenko, L. I. Certain Problems of Chromatographic Separation of REE 112

[illegible], Yu. Yu., V. P. [illegible], V. S. Kolosova. Process of the Separation of Elements of the Cerium Sub-Group by REE Cationite 121

Chuveleva, Ye. P., N. N. Tunitskiy, and V. V. Nekrasov. Separation of REE by the Counter Flow Chromatography Method 129

Kolosova, G. M., and M. M. Senyavin. Separation of REE by Anionites 138

Sklyarenko, S. I., L. E. Krauze, and V. A. Moryakova. Comparative Evaluation of Electrochemical Methods of Producing Ytterbium 145

Tunitskiy, K. V. Study of the Method of Separating [redacted] Paper Filters for the Purpose of Obtaining Ce[illegible] Without a Carrier 151

Alimarin, I. P., and F. I. Pavlotskaya. The Separation of Rare Earth Elements in the Form of Oxalates and Fluorides in the Presence of Large Quantities of Other Elements 168

Kolosova, V. L., L. K. Ponomareva. A Rapid Method of Determining Cerium in Loparite 176

Ambrozhiy, M. N. On the Problem of the Chemical Control of Compound Purity of Rare Earth Elements of the Cerium Subgroup 179

Ambrozhiy, M. N., and Ye. F. Luchnikova. On the Problem of a Qualitative Determination of Ytterbium and Samarium 186

Poluektov, N. S. On the Reaction of the Salts of Rare Earth Elements With Rhodizonic Acid 190

Kuznetsov, V.I., and Ye. V. Mitrofanova. Chemical Control in the Separation of Rare Earth Elements of the Yttrium Subgroup 192

Poluektov, N. S., R. S. Lauer, and R. Ye. Dagayatirskaya. The Application of Distributive Chromatography on Paper for an Approximate Determination of the Composition of Rare Earth Elements 199

POTAPOV, V.K.; VASIL'YEV, V.G.; TUNITSKIY, N.N.

Investigation of the ionization and dissociation of n-octane and n-nonane molecules by means of bombardment with "quasi-monokinetic" electrons. Probl.fiz.khim. no.2:146-162 '59. (MIRA 13:7)

1. Laboratorii stroyeniya molekul i adsorbtsionnykh protsessov Nauchno-issledovatel'skogo fiziko-khimicheskogo instituta imeni L.Ya.Karpova. (Octane) (Nonane) (Electrons)

SOV/80-32-3-11/43

5(2)

AUTHORS: Tikhomirov, M.V., Tunitskiy, N.N.

TITLE: The Separation of the Isotopes of Carbon and Oxygen by the Rectification of CO in a 12-m Column (Razdeleniye izotopov ugleroda i kisloroda rektifikatsiyey CO na 12-metrovoy kolonne)

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol XXXII, Nr 3, pp 531-536 (USSR)

ABSTRACT: The stable carbon isotope C^{13} is used for studying the dissociation of molecules, for resolving optical and radio-frequency spectra, etc. The stable oxygen isotope O^{18} is also needed for many chemical investigations. An apparatus has been developed containing a packed rectification column (Figure 1) for the low-temperature rectification of CO. The upper reservoir of the column contained 400 - 600 cm^3 CO with a lowered C^{13} content. This reservoir was filled at regular intervals with CO of normal C^{13} content. After 52 days the coefficient of separation of carbon reached 67.8, that of oxygen 23.6. On reaching this coefficient the column produced within 36 days 82 g of CO with a content of C^{13} from 30 - 37% and O^{18} from 3.5 - 4.2%. This corresponds to 34.5 times and 21 times of the

Card 1/2

SOV/80-32-3-11/43

The Separation of the Isotopes of Carbon and Oxygen by the Rectification of CO in a 12-m Column

natural values respectively. The column may also be used for the production of C^{13} if the raw material contains the substance at a concentration of 1% or higher. N.I. Nikolayev, L.P. Lipikhin, A.K. Tsapuk and Yu.A. Shavarin helped in the work.
There are 2 diagrams, 1 graph and 8 references, 3 of which are Soviet, 3 English and 2 German.

SUBMITTED: November 10, 1957

Card 2/2

5(4)

SOV/76-33-4-28/32

AUTHORS: Fedoseyeva, O. P., Cherneva, Ye. P., Tunitskiy, N. N.

TITLE: Investigation of the Kinetics of Ion Exchange Sorption (Issledovaniye kinetiki ionoobmennoy sorbtsii).II. Kinetics of Exchange With Participation of Hydrogen Ions (II. Kinetika obmena s uchastiyem vodorodnykh ionov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 4, pp 936-942 (USSR)

ABSTRACT: The investigation under review deals with the process of the complete cation exchange and limiting cases of the exchange - the self-diffusion and diffusion of ions of microcomponents in the resin - of various cation forms. In the case of a complete exchange the investigation concerned the initial as well as the end stage at which one of the exchanging cations was present in a small quantity. The effective diffusion coefficients (DC), that were computed for this case, were compared with the (DC) for the ions of the microcomponents. To simplify calculations the authors investigated along with the full exchange in the resin, the exchange of the cations in cation exchanger membranes (from sulphurized polystyrene

Card 1/6

SOV/76-33-4-28/32

Investigation of the Kinetics of Ion Exchange Sorption. II. Kinetics of Exchange With Participation of Hydrogen Ions

resin). In fact, when exchanging cations of different mobilities through the membrane, an electric field is generated (as in the case of the complete exchange in resin), which can be measured. The kinetics of the cation exchange was investigated on polystyrene resins with various contents (high, normal, low) of divinyl benzene. The kinetic experiments took place at 19-20°. Under investigation were monovalent cations in 0.165 n and bivalent cations in 0.25 n and 1 n solutions. An adsorption or desorption method was applied, with use of the isotopes Na^{24}, Rb^{86}, Sr^{89} and Ca^{45}. The above mentioned membranes contained 70% of resin KU-2 and 30% divinylbenzene. It was observed (Fig 1) that the quickest exchange is that of H^+-ions from the resin with Na^+-ions of the solution, and the slowest is the diffusion of the ions of the microcomponents of sodium in the resin (in the H-form). Values are given of the effective (DC) for the exchange between the Na^+ and H^+ in the resin (with lower

Card 2/4

SOV/76-33-4-28/32

Investigation of the Kinetics of Ion Exchange Sorption. II. Kinetics of Exchange With Participation of Hydrogen Ions

divinylbenzene content) (Table 1), as well as the (DC) of Na$^+$ being found in microamounts in the resin (Table 2), and it proceeds therefrom that the complete exchange between Na$^+$ and H$^+$ takes place with a higher effective (DC) than are the (DC) of the ions of the microcomponents of sodium, which diffuse in resin (in the H-form). The same also holds for rubidium. The effective (DC) increase with a decrease in the relative content of H-ions in the resin which is explained by an anomalously greater mobility of the H-ions in the resin. The ions Na$^+$, Ca^{2+} and Ce^{3+} were investigated on the cation exchanger membrane. It was observed that (Fig 4) the effective (DC) increase with the decrease of the relative content of H-ions in the solution. There are 6 figures, 2 tables, and 7 references, 1 of which is Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva (Physico-chemical Institute imeni L. Ya. Karpov, Moscow)

Card 3/4

SOV/76-33-5-28/33

5(4)

AUTHORS: Fedoseyeva, O. P., Tunitskiy, N. N. (Moscow)

TITLE: Investigation of the Kinetics of Ion Exchange Sorption (Issledovaniye kinetiki ionoobmennoy sorbtsii). 3. Complete Exchange Between Univalent and Bivalent Ions in Resins (3.Polnyy obmen mezhdu odnovalentnymi i dvukhvalentnymi ionami v smolakh)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 5, pp 1140 - 1146 (USSR)

ABSTRACT: The process mentioned in the title was investigated on the cation exchanger KU-2. The limiting cases of self-diffusion and the diffusion of the ion microcomponents with various cation occupation of the exchanger were measured together with the total exchange. Figure 1 shows the dependence of the diffusion coefficient for strontium on the composition of the resin containing Sr and H ions (upper curve) and Sr and Na ions (lower curve). The diffusion coefficients of the Sr ions show a linear dependence on the composition of the solution. The diffusion proceeds faster in resin containing H and Na ions than in resin containing Sr ions only. Table 1 shows the results of the experimental series carried out in order to

Card 1/3

Investigation of the Kinetics of Ion Exchange Sorption. SOV/76-33-5-28/33
3. Complete Exchange Between Univalent and Bivalent Ions in Resins

determine the diffusion coefficients of the ion microcomponents and the coefficients of self-diffusion. Hence it appears that univalent and bivalent ions diffuse faster in a resin containing univalent ions than in a resin containing bivalent ions. This dependence can be explained to some degree by the different swelling capability of the resin containing univalent and bivalent ions (Table 2). The swelling capability depends more on the cation occupation of the resin than on the concentration of the swelling solution. Figures 2-4 show the results of the investigation of the exchange between univalent ions (Na^+ and H^+) and bivalent ions (Ca^{2+} and Sr^{2+}) as well as the curves of the total exchange, the self-diffusion and the diffusion of the ion microcomponents. In all cases, the self-diffusion of the sodium ions was the fastest, that of the strontium ions the slowest process. Figures 5 and 6 compare the kinetics of the exchange of Sr ions from the resin for H ions from the solution with the exchange for Na ions from the solution. There are 6 figures, 2 tables, and 4 references, 2 of which are Soviet.

Card 2/3

Investigation of the Kinetics of Ion Exchange Sorption. SOV/76-33-5-28/33
3. Complete Exchange Between Univalent and Bivalent Ions in Resins

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova Moskva
(Physico-chemical Institute imeni L. Ya. Karpov, Moscow)

SUBMITTED: November 16, 1957

Card 3/3

5(4)

AUTHORS: Potapov, V. K., Vasil'yev, V. G., Tunitskiy, N. N. SOV/20-126-3-43/69

TITLE: The Ionization and Dissociation of the Molecules of n-Octane and n-Nonane by Monoenergetic Electrons (Ionizatsiya i dissotsiatsiya molekul n-oktana i n-nonana monoenergeticheskimi elektronami)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 3, pp 612-615 (USSR)

ABSTRACT: In the introduction to the present paper investigations carried out by V. L. Tal'roze and Ya. L. Frankevich on the determination of the affinity of some molecules are mentioned (Ref 4). In the present paper the formation of fragment ions and the excitation of molecule ions by monoenergetic electrons is investigated. This is done by investigating the occurrence of fragment- and molecule ions of n-octane, n-octane-2D_1 and n-nonane-5D^{13}. Measurements were carried out in a special mass spectrograph, and for obtaining the monoenergetic electrons a method developed by R. E. Fox (Ref 6) was used. Tables 1 and 2 show the potentials of molecule- and fragment-ions of the type $C_nH_{2n+1}^+$ and $C_nH_{2n}^+$ occurring in this mass spectrograph, and two diagrams show the ion flux of molecule- and fragment ions in dependence on electronic energy. From these

Card 1/2

The Ionization and Dissociation of the Molecules of n-Octane and n-Nonane by Monoenergetic Electrons SOV/20-126-3-43/69

results the schemes for the formation of the fragment-ion $C_nH_{2n+1}^+$ and of the fragment-ion $C_nH_{2n}^+$ from n-octane are then obtained. Finally, the authors thank M. V. Tikhomirov for his help and evaluation of results, as well as M. V. Gur'yev for the synthetic production of n-octane-2D_1 and n-nonane-5C^{13}. There are 3 figures, 2 tables, and 10 references, 3 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova (Scientific Physico-chemical Research Institute imeni L. Ya. Karpov)

PRESENTED: February 27, 1959 by S. S. Medvedev, Academician

SUBMITTED: February 18, 1959

Card 2/2

82833
S/048/60/024/008/010/017
B012/B067

24.6100

AUTHORS: Gur'yev, M. V., Tikhomirov, M. V., Tunitskiy, N. N.

TITLE: Dissociation of Large Molecules in Electron Impact

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 8, pp. 975-978

TEXT: The present paper generally deals with the interaction between an electron and a large molecule. Usually, it is assumed in such a case that the molecular ion takes part in the dissociation as a whole. The calculations of the authors (Ref. 6) showed, however, that also with usual electron energies (~70 ev) the large molecules (C_{44}) may dissociate not in the same way as is the case in the experiments. A hypothesis is suggested to explain this fact. It says that in the processes accompanied by a dissociation of the molecule only a limited number of vibrational degrees of freedom is excited and that dissociation takes place in the region of excitation. It is demonstrated that this hypothesis can be accurately controlled. It is pointed out

Card 1/3

82833
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Dissociation of Large Molecules in Electron Impact

that if the electron "arrives" with approximately equal probability in any part of the molecule and if the excitation energy transmitted by this electron is distributed only over a small part of the molecule - in the dissociation exactly this part of the molecule would be bound to "fall out" in the form of a fragment ion. Hence, the fragment ions would be bound to form with equal probability from any part of the molecule. The experiments conducted by the authors confirmed that the main fragment ions are actually formed in this way. It is pointed out that this is the case in the entire range from 1000 ev to energies which are by 1 ÷ 2 ev above the potential at which the corresponding ion is formed. The investigations of the mass spectra in the case of such high electron energies were conducted by Yu. M. Miller. The experiments made by the authors showed that the mass spectra of the molecules investigated are equal not only at 50 ÷ 70 ev but also at any electron energy. This proves that the interaction between electron and molecule is independent of the dimensions of the molecule which confirms the hypothesis on the "local" character of this interaction. In conclusion, considerations are made for the case of double bonds and other possible couplings of bonds

Card 2/3

82833

Dissociation of Large Molecules in Electron Impact

S/048/60/024/008/010/017
B012/B067

in the molecule. There are 1 figure and 10 references: 4 Soviet and 6 British.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute im. L. Ya. Karpov)

Card 3/3

TUNITSKIY, N.N.

report to be submitted for the IUPAC 21st Conference and 18th Intl. Congress of Pure and Applied Chemistry, Montreal, Canada, 2-12 August 1961

GORODISKIY, A. V., Academy of Sciences UkSSR, Kiev - "The oscillographic investigation of the electrochemical kinetics in fused salts" (Section A.3,e.2 - Session I, 11 Aug 61, afternoon)

GURVICH, L. V., Academy of Sciences USSR, Moscow - "The calculation of thermodynamic functions of gases in a wide temperature range" (Section A.3,c,(1), Session II - 8 Aug 61, afternoon)

KARGIN, V. A., Physico-Chemical Institute imeni L. Ya. Karpov, Moscow - "Vitrification phenomena in crystallin polymers" (Section B.4 - 7 Aug 61, afternoon)

KISELEV, A. V., Moscow State University imeni M. V. Lomonosov - "The influence of surface heterogeneity and adsorbate-adsorbate interaction on the adsorption properties of solid surfaces" (Joint Session, Sections A.2 and B.1 - 8 Aug 61, morning)

KONDRAT'YEV, V. N., Institute of Chemical Physics, Academy of Sciences USSR, Moscow - "The NO_2 radical" (Section A.1, Session I - 11 Aug 61, morning) (Also, Section A.1, Chairman, Session I - 8 Aug 61, morning)

KUZNETSOV, V. I., Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, Academy of Sciences USSR - "A novelty in the use of organic co-precipitants for concentration of small amounts of the elements" (To be presented in Russian) (Section C.2 - 11 Aug 61, morning)

LAVRUKHINA, A. K., BAKOVSKIY, E. E., and MOSKALEVA, L. P., Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, Academy of Sciences USSR - "New data on radiochemical investigations of the processes of fission and fragmentation induced by high energy protons" (Section A.4 - 8 Aug 61, afternoon)

LOVACHEV, L. A., Academy of Sciences USSR, Moscow - "Determination of rate constants of elementary processes from flame velocities as a function of temperature, pressure, and molecular transfer coefficients" (Section A.3,b,(2) - 7 Aug 61, afternoon)

MUNDIACH, S. (Probably MUNDYACH, S.) and GERASIMOV, Y. I., Moscow State University imeni M. V. Lomonosov - "Study of the thermodynamic properties of the system iron-platinum" (Section A.3,c,(3), Session II(A) - 11 Aug 61, morning)

PANCHENKOV, G. M., KOLCHIN, A. M., MALANOV, V. F., and SAGEYN, Ya., Moscow State University imeni M. V. Lomonosov - "Emission of complex ions in solid-phase reactions" (Joint Session, Sections A.2 and B.1, 8 Aug 61, morning)

SEMENOV, N. N., Institute of Chemical Physics, Academy of Sciences USSR, Moscow - "Certain chemical reactions at reduced temperatures and related problems of energy transfer" (To be presented in Russian) (Plenary lecture - Saturday, 12 Aug 61)

SHILOV, Ye. A., Academy of Sciences UkSSR, Kiev - "The active agents and the intermediary complexes in the heterolytic reactions of halogenation of the organic compounds" (Section A.1, Session II - 11 Aug 61, morning)

SMIRNOV, M. V., Electrochemistry Institute, Sverdlovsk - "The equilibrium between the titanium subgroup metals and the salt melts" (Section B.3 - 7 Aug 61, afternoon)

TAL'ROZE, V. L., Institute of Chemical Physics, Academy of Sciences USSR - "Reactions of ions and molecules in the gas phase" (Section A.1, Session I - 9 Aug 61, afternoon)

TERENIN, Aleksandr N., Leningrad State University imeni A. A. Zhdanov - (Section A.1, Chairman, Session I - 8 Aug 61, afternoon Session) (Also on program for Section A.1, Session I - 9 Aug 61, afternoon)

TERENIN, Aleksandr N., VILESOV, F. I., KURBATOV, B., and DODONOVA, N. Ya., Leningrad State University imeni A. A. Zhdanov - "Mass-spectrometry and luminescence of radicals in the photodissociation and photoionization of molecules by vacuum ultra-violet radiation" (Section A.1, Session I - 9 Aug 61 - afternoon)

TUNITSKIY, N. N., Scientific Research Physico-Chemical Institute imeni L. Ya. Karpov - "On the dissociation of molecules on electron impact and the early stages of radiation-chemical processes" (Section A.1, Session I - 8 Aug 61, afternoon)

VAINSHTEYN, Emmanuil Ye., and KOROLEV, V. V., Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, Moscow - "The plasma generator and its use for spectral analysis of alloys and rocks" (Section C.1 - 8 Aug 61, morning)

VINOGRADOV, A. P., LAVRUKHINA, A. K., and REVINA, L. D., Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, Academy of Sciences USSR - "The study of nuclear reactions in iron meteorites under the action of high energy protons" (Section A.4 - 8 Aug 61, afternoon)

YAKOVLEV, Yu. V., and ALIMARIN, I. P., Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, Academy of Sciences USSR - "The determination of trace impurities in some materials for semiconductor techniques by radio-activation analysis" (To be presented in Russian) (Section C.1 - 8 Aug 61, afternoon)

YEROFEYEV, Boris V., Institute of Physical-Organic Chemistry, Minsk - "The effect of donor and acceptor admixtures on the decomposition rate of solids" (Section A.2 - 8 Aug 61, afternoon)

32324
S/081/61/000/024/002/086
B138/B102

54600

AUTHORS: Gur'yev, M. V., Tikhomirov, M. V., Tunitskiy, N. N.

TITLE: Dissociation of large molecules under electron impact

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24, 1961, 14, abstract 24B79 (Tr. Tashkentsk. konferentsii po mirn. ispol'zovaniyu atomn. energii, v. 1, 1959. Tashkent, AN UzSSR, 1961, 378 - 382)

TEXT: Comparison has been made the mass spectra of synthesized n-octane and n-octane-2d_1, n-nonane and n-nonane-5C^{13} from normal and labeled molecules. The probability of the formation of "leading" fragment ions of the C_nH_{2n+1} type was found to be roughly the same for any part of a molecule, i. e. by breaking two C - C bonds. The intensities of the remaining ions were calculated on the assumption that they are formed from parts of the molecules whose compositions correspond to the leading ions. The results of the calculation are in very good agreement with experimental data. In

Card 1/2

32324
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Dissociation of large molecules ...

all probability type C_n^+ and C_nH^+ ions are formed from the end groups of a molecule. Thus, dissociation processes, which require very considerable excitation energy, are most likely to take place on the end groups of a molecule. [Abstracter's note: Complete translation.]

X

Card 2/2

Tunitskiy, N. N.

S/076/61/035/001/012/022
B004/B060

AUTHORS: Cherneva, Ye. P., Barabanov, S. R., Bryukhanov, V. A., Pashkov, A. B., and Tunitskiy, N. N. (Moscow)

TITLE: Change in the selectivity of monofunctional sulfonated cation exchangers as a function of the concentration of initial electrolyte solutions and the charges of exchanging ions

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 1, 1961, 189-191

TEXT: The authors wanted to study the selectivity of the sulfonated cation exchanger of the type KY-2 (KU-2). The exchanger was obtained by copolymerization of styrene with divinyl benzene and the subsequent sulfonation by means of chloro sulfonic acid. In H form, this resin is a polyacid, while in salt form it is a polyelectrolyte, whose anions are strongly bound to the resin, and whose cations are mobile. The following aspects were investigated through a study of the equilibrium of ion exchange: a) the dependence of selectivity on the exchanger capacity; b) the dependence of selectivity on the cross linking; c) on the initial

Card 1/3

concentration of the electrolytes, d) on the valence of exchanging ions. The weighed-in portion of dried resin was shaken for 35-40 hours at room temperature with an exactly known volume of an electrolyte solution of a known concentration, and the concentration of the components in the solution was then determined. A resin with equal cross linking (7%), but different capacity (0.18 mg-equiv/1 and 4.63 mg-equiv/1) was taken for the $RH^+ - Ca^{2+}$ system. The coefficient of selectivity was calculated by B. P. Nikol'skiy's equation:
$K = (N_{Ca}^{1/2}/n_{Ca}^{1/2})(n_H/N_H)$. N, n are the equivalent portions of cations in resin and in solution, respectively. The following results were obtained for resin with the capacity 0.18 mg-equiv/1: for 0.895 N $CaCl_2$ K = 0.35±0.1; for 1.90 N $CaCl_2$ K = 0.12±0.03. For resin with a capacity 4.63 mg-equiv/1, K amounted to 8.99±0.82 for the first mentioned concentration of $CaCl_2$, and 4.75±0.07 for the second concentration. Resin, cross-linked with 7% and resin with 24% divinyl benzene displayed no change of selectivity in the $RH^+ - Na^+$ system. Resin with 7% cross linking displayed

Card 2/3

on a rising concentration of the external solution a reduced selectivity in the $RH^+ - Na^+$ and $RH^+ - La^{3+}$ systems. With constant specific loading, capacity, and cross linking, selectivity increased with the valence of the ion charge. There are 1 figure, 2 tables, and 11 references: 3 Soviet-bloc and 7 non-Soviet-bloc.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute imeni L. Ya. Karpov)

SUBMITTED: May 13, 1959

Card 3/3

TUNITSKIY, N.N.

Fluctuations in the transit time of a stray particle in a given region. Zhur.fiz.khim. 35 no.10:2394-2395 O '61. (MIRA 14:11)

1. Fiziko-khimicheskiy institut imeni L.Ya.Karpova.
(Particles (Nuclear physics))

TUNITSKIY, N.N.; KURPIYANOV, S.Ye.; PEROV, A.A.

Mass spectra of molecules and radiation chemistry. Izv. AN SSSR. Otd.khim.nauk no.11:1945-1953 N '62. (MIRA 15:12)

1. Fiziko-khimicheskiy institut im. L.Ya. Karpova.
(Mass spectrometry) (Radiochemistry)

36775
S/089/62/012/005/006/014
B101/B108

21.4200

AUTHORS: Nikolayev, N. I., Kolotyrkin, V. M., Tunitskiy, N. N.

TITLE: Separation of lithium isotopes on cationites by means of sharp-edged moving bands

PERIODICAL: Atomnaya energiya, v. 12, no. 5, 1962, 404 - 407

TEXT: The application of the method of F. Spedding, I. Powel, H. Swec (J. Amer. Chem. Soc., 77, 6125 (1955)) to separating the lithium isotopes on a КУ-2 (KU-2) cationite is described. Since neutralization of the H^+ form of the resin led to a temperature increase and to irreversible adsorption of lithium an NH_4^+ buffer band was used. First, 0.2 N NH_4OH was passed through a column with KU-2 in H^+ form. A 23-cm long NH_4^+ band was observed owing to the change in color of the resin. 0.2 N LiOH formed a 33-cm long visible Li^+ band. The bands were eluated by means of 0.25 N NaOH. The transition of the cationite from the Li^+ to the Na^+ form is not visible (no change in color). For calculating the separation factor α the authors

Card 1/2

S/089/62/012/005/006/014
B101/B108

Separation of lithium isotopes...

write: $N_{sol}(\alpha - 1)y = \sum_{i<i_n} v_i(N_i - N_o)$. N_{sol} is the molar fraction of Li^6 in the solution, y is the distance covered by the Li band, v_i is the length of the section from which the i-th sample had been taken, i_n is the coordinate of that point at which the isotopic composition is constant. For LiOH the following values were obtained in two types of KU-2: $\alpha = 1.0010 \pm 0.0003$ and $\alpha = 1.0055 \pm 0.0003$. For Li_2SO_3, $\alpha = 1.0020 \pm 0.0005$. For a lithium band length of 33 cm, the separation factor was 1.32. There are 3 figures and 2 tables.

SUBMITTED: May 20, 1961

Card 2/2

S/056/62/043/003/004/063
B125/B102

AUTHORS: Kuprianov, S. Ye., Perov, A. A., Tunitskiy, N. N.

TITLE: Cross sections for dissociation of D_3^+ ions on D_2^+ and D^+ ions in collisions with deuterium molecules

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 3(9), 1962, 763-764

TEXT: The D_3^+ dissociation cross section resulting from single collisions with D_2^0 molecules were determined at energies between 30 and 100 kev of the D_3^+ ions, using a mass spectrometer with two magnetic analyzers. These collisions took place at $p \sim 3 \cdot 10^{-4}$ mm Hg in a collision chamber between two magnetic analyzers. The D^+ and D_2^+ formation cross sections $\sigma = I^* kT/Ipl$ have the following values

Card 1/2

Cross sections for dissociation ...

S/056/62/043/003/004/063
B125/B102

at the energies of the D_3^+ ions in kev	30	40	50	60	70	80	90	100
$\sigma(D^+)$	0.6	0.9	0.9	0.8	1.2	1.2	1.2	1.3
$\sigma(D_2^+)$	0.8	1.1	1.0	0.9	1.1	1.2	1.2	1.2

I^* and I are the secondary and primary ion currents, l is the effective length of the chamber. The increase of the cross section below 50-60 kev is probably due to the excitation of D_3^+ ions. The second increase of the cross sections at energies between 50 and 60 kev and more is due to the ionization of D_3^+ ions. The detachment of two electrons from the D_3^+ ions might be important at energies above 100 kev. The D^+ and D_2^+ production cross sections agree within the limits of measurement accuracy ($\sim$ 25%). There is 1 table.

SUBMITTED: March 24, 1962

Card 2/2

KUPRIYANOV, S.Ye.; PEROV, A.A.; TUNITSKIY, N.N.

Dissociation cross sections for 3.5 - 100 kev. D_2^+ ions in collision with D_2 molecules. Zhur. eksp. i teor. fiz. 43 no.5:1636-1637 N '62. (MIRA 15:12)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.
(Dissociation) (Deuterium) (Ions)

KARGIN, V.A. akademik; EFENDIYEV, A.A.; CHERNEVA, Ye.P.; TUNITSKIY, N.N.

Preparation and study of a homogenous polymeric membrane having complex-forming properties. Dokl. AN SSSR. 144 no.6:1307-1308 Je '62. (MIRA 15:6)

1. Fiziko-khimicheskiy institut im. L.Ya.Karpova.
(Membranes (Chemistry)) (Polymers)

E NDIYEV, A.A.; CHERNEVA, Ye.P.; TUNITSKIY, N.N.; KARGIN, V.A.

Preparation of complex-forming polymeric materials as homogeneous films, and the study of their properties. Azerb. khim. zhur. no.5:73-78 '63 (MIRA 17:8)

L 13103-63 EWT(1)/BDS AFFTC/ASD/SSD

ACCESSION NR: AP3003417 S/0051/63/015/001/0100/0106

AUTHOR: Tunitskiy, N.N.; Bagdasar'yan, Kh.S. 53

TITLE: Concerning resonance excitation energy transfer 9 between molecules taking diffusion into account

SOURCE: Optika i spektroskopiya, v.15, no.1, 1963, 100-106

TOPIC TAGS: luminescence, energy transfer, diffusion, deactivation

ABSTRACT: The authors consider the time variation of the concentration of excited molecules in a luminescent solution under the influence of spontaneous deactivation and resonance energy transfer, the probability of which equals α/r^m, where r is the distance from the excited molecule to the quenching center and α is a constant. The problem reduces to solution of a diffusion equation with a sink. From the solution one can find the ratio of the steady-state rate of change of the concentration of excited molecules to the initial rate for $m = 4$ and $m = 6$. This ratio depends on the dimensionless parameter α/DR_0^{m-2}, where D is the diffusion coefficient and R_0 is the sum of the radii of the excited molecule and the quenching center. From comparison with the equations of coagulation theory there can be found the radius of the equivalent absorbing sphere. The authors also consider

Card 1/2

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ACCESSION NR: AP3003417

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the problem of the concentration of excited molecules in the presence of a constant source of such molecules (steady excitation) and elucidate the roles of two excitation energy loss mechanisms for different values of the parameter in the two extreme cases when D → 0 and when D → ∞. There is a significant difference between the end results for the two cases for different values of α in the reasonable range from 10^{-30} to 10^{-33} cm^6/sec. Orig.art.has: 36 formulas, 1 table and 1 figure.

ASSOCIATION: none

SUBMITTED: 16Nov62 DATE ACQ: 30Jul63 ENCL: 00

SUB CODE: PH NO REF SOV: 007 OTHER: 001

Card 2/2

Tunitskiy, N. N.

10

ACCESSION NR: AP3004484 S/0048/63/027/008/0994/0995

AUTHOR: Sena, L. A.

TITLE: Second All-Union Conference on the Physics of Electron and Atom Collisions [Uzhgorod, 2—9 October 1962]

SOURCE: AN SSSR. Izvestiya, ser. fiz., v. 27, no. 8, 1963, 994-995

TOPIC TAGS: conference, electron collision, atom collision, collision physics

ABSTRACT: The II Vsesoyuznaya konferentsiya po fizike elektronny*kh i atomny*kh
stolknoveniy (Second All-Union Conference on the Physics of Electron and Atoms
Collisions), was held in Uzhgorod, 2—9 October 1962. The following reports
were presented: "Theory of the charge-exchange process during atomic collisions,"
by Yu. N. Demkov; "Charge-exchange of multicharge ions," by I. P. Flaks; "Ioniza-
tion due to atomic collisions," by N. V. Fedorenko; "Excitation of atoms and
molecules due to electronic collisions," by I. P. Zapesochny*y; "Charge exchange
and ionization during atomic collisions in the high-energy range," by V. S.
Nikolayev; "Photoionization of gases and vapors by vacuum ultraviolet radiation,"
by Academician A. N. Terenin and F. I. Vilesov; "Effective cross sections of
atomic collisions important in the theory of gaseous quantum generators," by
I. I. Sobel'man; "Dissociation of molecules and ions during collisions of fast
particles," by N. N. Tunitskiy; and "Corpuscular diagnostic of plasma," by
V. V. Afrosimov.

ASSOCIATION: none

KUPRIYANOV, S.Ye.; TUNITSKIY, N.N.; PEROV, A.A.

Dissociation of D_2^+ ions in collisions with molecules in the energy range 3.5 to 100 Kev. Zhur. tekh. fiz. 33 no.10:1252-1259 O '63. (MIRA 16:11)

1/1

ACCESSION NR: AP4020332 S/0089/64/016/003/0245/0249

AUTHOR: Kalinina, M. D.; Nikolayev, N. I.; Gur'yev, M. V.; Tunitskiy, N. N.

TITLE: Investigating the effect of Co^{60} gamma-radiation on strong-base anionites AB-17 and AM

SOURCE: Atomnaya energiya, v. 16, no. 3, 1964, 245-249

TOPIC TAGS: anionite, gamma radiation, Co^{60} radiation, radioactive isotope, radiolysis, vacuum exsiccator, magnesium, trimethyl amine, gaseous product, exchange group, inert state, calcium chloride, nitric acid, carbonate ion

ABSTRACT: Experiments have been made on the radiation stability of the polymerization type anionites AB-17, containing 6 and 16% divinyl benzene (also referred to as AB-17X6 and AB-17X16), and AM by irradiating them in water with Co^{60}. The maximum total irradiation dose amounted to 4.7×10^8 roentgens. Before irradiation the anionite samples were changed into a hydroxyl form by a caustic soda solution and then carefully washed with water. After irradia-

Card 1/2

ACCESSION NR: AP4020332

tion, the anionites grew dark and their weight and volume became smaller. The resulting solution containing the radiolytic decomposition products of the anionites is foamy, acquires a yellow tinge, and becomes turbid because of the presence of a fine anionite fraction in it. Synthetic ionites are organic polymeric substances and are therefore affected by irradiation in the same way as are polymers. It should be borne in mind that the chemical action of the radiation may largely depend on the nature of the substance, that is, on the newly formed radicals and the probability of their interaction with the new compounds. Generally, however, the radiation stability of organic compounds, including ionites, is limited to a dose of the order of 10^9 roentgens. When irradiated with a dose of 4.7×10^8 roentgens, the relative volume of the AB-17X16, AB-17X6, and AM anionites is reduced by 35, 45, and 43% respectively. Orig. art. has: 1 formula and 5 tables.

ASSOCIATION: None

SUBMITTED: 24Apr63	DATE ACQ: 31Mar64	ENCL: 00
SUB CODE: NS, CH	NR REF SOV: 015	OTHER: 012

Card 2/2

ACCESSION NR: AP4033680 S/0074/64/033/004/0439/0461

AUTHOR: Sigodina, A. B.; Nikolayev, N. I.; Tunitskiy, N. N.

TITLE: Ion exchange kinetics in sulfonated cation exchange resins

SOURCE: Uspekhi khimii, v. 33, no. 4, 1964, 439-461

TOPIC TAGS: ion exchange kinetics, cation exchange sulforesin, film diffusion, autodiffusion, ion microcomponents, electroconductivity

ABSTRACT: This is a treatise prompted by the fact that preparation of high quality ion exchange resins and their regeneration is only possible if data about them both in steady as well as kinetic states are known. Ion exchange in steady state is well known, but there is a scarcity of information on ion exchange kinetics. This article consists of the following sections: 1. The fundamentals of ion exchange kinetics theory in which the following aspects are mathematically analyzed: a). diffusion through the solution film adjacent to the ion exchange resin at constant concentration of the outside solution; b) diffusion through the film at variable concentration of the outside solution; c) diffusion in the ion exchange particle at constant concentration of the outside solution; d) diffusion taking place simultan-

Card 1/3

ACCESSION NR: AP4033680

eously-both in the solution film and in the ion exchange resin particle. 2. The experimental methods of investigation in which two methods are used: a thin stationary layer (with constant concentration of the outside solution); an exchange between the solution and the ion exchange resin in a limited volume of solvent (with variable concentration of the solution). 3. Autodiffusion in cation exchange resins. The autodiffusion coefficient depends on a number of factors, among others - on the cross linkage rate, as determined with a quantity of divinylbenzene, temperature and ion charge. 4. Diffusion of ion microcomponents. When ions in microconcentrations - diffuse in the ion exchange resin, the cationic form of the latter remains unchanged. 5. Kinetics of full exchange. Here the ionic form of the cation exchange resin changes and no forecasts about a constant diffusion coefficient can be made since the ions being exchanged may have quite different mobility. In addition, when the cation exchange resin changes its form, its degree of swelling also changes. 6. Peculiarities in exchange kinetics of large organic ions. It is found that the rate of exchange depends on a number of factors: degree of cross linkage in the cation exchange resin, temperature, ion concentration in the solution and the cationic form of the cation exchange resin. 7. Relationship between diffusion and electroconductivity. Coefficient of autodiffusion

ACCESSION NR: AP4033680

of ions in the ion exchange resin is determined by electroconductivity measurements. Orig. art. has: 6 figures, 18 formulas, 10 tables.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute)

SUBMITTED: 00	DATE ACQ: 07May64	ENCL: 00
SUB CODE: GC, GP	NO REF SOV: 024	OTHER: 049

Card 3/3

ACCESSION NR: AP4020586 S/0057/64/034/003/0536/0545

AUTHOR: Gur'yev, M.V.; Sumin, L.V.; Tunitskiy, N.N.

TITLE: On the measurement of the kinetic energy of fragmented ions by means of a mass spectrometer. 1. Analysis of the line shape

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.3, 1964, 536-545

TOPIC TAGS: mass spectrometry, ion energy distribution, molecular ion dissociation, mass spectrometer line shape, faltung equation, nitrogen ion, nitrogen molecule ion

ABSTRACT: This paper is concerned with the measurement by means of a mass spectrometer of the energy distribution of atomic ions formed by the dissociation of excited molecular ions. To accomplish such a measurement it is necessary numerically to solve the faltung equation relating the observed line shape, the true line shape and the instrumental broadening, and then to solve a second integral equation relating the true line shape to the energy distribution in the center of mass system of the dissociating ion. These two mathematical processes are discussed in some detail. Concerning the solution of the faltung equation, the following two possibly useful suggestions are made: 1) It frequently occurs that the significant difference be-

ACCESSION NR: AP4020586

tween the observed and the instrumental line shapes consists of relatively small deviations in one wing, the effect of which may be masked in the numerical work by random errors from the more intense central portion of the line. It is suggested that in such a case the three functions involved be replaced by their products with an appropriately chosen exponential function. The relation between the functions remains that of faltung, and the effect of the wing shape in the numerical procedure can be enhanced by properly choosing the exponential. 2) It is suggested that the sharp central peak in the true line shape (when there is such) be represented by a delta function. Means for determining the coefficient of the delta function are discussed. The integral equation relating the true line shape to the ion energy distribution is derived on the assumption that the energy distribution is isotropic, and approximate methods for solving it are discussed. The fraction of the total number of ions formed that enter the spectrometer (required for cross section measurements), and the average energy, can be obtained from the first two moments of the observed and the instrumental line shapes, without solving the faltung equation. The cross sections for production of N^+ and N_2^+ by 140 eV electron impact, and the energy distribution of the N^+ ions so produced, were determined by the methods discussed. A type MV-2302 mass spectrometer was employed, with a secondary emission

ACCESSION NR: AP4020586

multiplier to record the ion current. The mean energy of the N^+ ions was about 3.3 eV, varying somewhat with the strength of the extracting field. The cross sections for producing N^+ and N_2^+ were equal within the 20% experimental error. This last result is not in agreement with the findings of other workers; the yield of N^+ has usually been found to be an order of magnitude less than that of N_2^+. Orig.art. has: 22 formulas, 2 figures and 1 table.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L.Ya.Karpova, Moscow (Physical-Chemical Scientific Research Institute)

SUBMITTED: 18Feb63	DATE ACQ: 31Mar64	ENCL: 00
SUB CODE: PH	NR REF SOV: 005	OTHER: 007

Card 3/3

ACCESSION NR: AP4042932 S/0057/64/034/008/1441/1443

AUTHOR: Fomin, O.K.; Tikhomirov, M.V.; Tunitskiy, N.N.

TITLE: Mass spectra of organic ions formed on a heated oxidized molybdenum surface in the residual gas atmoshpere within a mass spectrometer

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.8, 1964, 1441-1443

TOPIC TAGS: ion source, ionization, catalytic activity, mass spectrum, molybdenum compound

ABSTRACT: The mass spectrum was recorded of the heavy ions formed on the heated surface of a 10 x 10 x 0.05 mm^3 99.9% pure molybdenum strip which had been oxidized by heating in air for 20 hours at 450 to 500°C, and which occupied the source position in a type MI-1305 mass spectrometer. The temperature of the molybdenum strip was monitored with a thermocouple; the spectrometer was exhausted to 7×10^{-6} mm Hg with a mercury diffusion pump; and ions originating elsewhere than on the molybdenum strip were prevented from reaching the spectrometer proper by platinum shields. When the Mo strip temperature was 400°C, ion currents of the order of 10^{-12} A/cm^2 were observed at mass numbers 58, 72, 84 and 86; currents of the order of 10^{-3} A/cm^2

ACCESSION NR: AP4042932

were observed at mass numbers 99, 95, 101, 110 and 114; and smaller ion currents were observed at mass numbers 59, 96, 111 and 112. All these ion currents behaved in the same way when the Mo strip temperature was varied. The maximum current occurred at 400°C. At lower temperatures the ion currents were smaller but stable, but at higher temperatures the currents decreased exponentially with time. At 415°C the time constants for the decrease of the most intense of the ion currents were in the vicinity of 2 hours. When the strip was heated to 500°C the currents ceased within a second and could be restored only by reheating the Mo strip in air. The results are compared with those obtained by E.Ya.Zandberg and N.I.Ionov (DAN SSSR 141, 139, 1961) with oxidized tungsten, and obvious explanations are suggested for such differences as exist. From the findings of J.W.Hickman and E.A.Gulbransen (Metals Tech. AIME, T.P.2144, April, 1947) concerning the formation of oxides on molybdenum surfaces and the behavior of the ion currents with varying emitter temperature, it is concluded that the active catalyst is MoO_3 and that the heavy ions probably contain oxygen. It is suggested that the ions of mass number 58 and 72 may be $C_3H_6O^+$ and $C_4H_8O^+$. Air containing 1% ethanol, propanol or toluol was admitted to the source chamber at a pressure of 10^{-3} mm Hg. No increase in any of the ion currents was thereby produced. Orig.art.has: 1 figure.

2/3

ACCESSION NR: AP4042932

ASSOCIATION: none

SUBMITTED: 10Nov63 ENCL: 00

SUB CODE: NP,GP NR REF SOV: 006 OTHER: 003

ACCESSION NR: AP4034581 S/0076/64/038/004/0955/0956

AUTHOR: Tikhomirov, M. V.; Komarov, V. N.; Tunitskiy, N. N.

TITLE: The formation of the N sub 3 sup + and N sub 4 sup + ions in the mass-spectrometer

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 4, 1964, 955-956

TOPIC TAGS: nitrogen, mass spectra, mass spectrometry, N sub 3 sup + ion, N sub 4 sup + ion, ionic current intensity, electron energy, formation cross section, sup 14 N sup 15 N sup ++ molecular ion, vibrational excitation, N sub 2 sup + ion, N sub 2 sup + ion

ABSTRACT: The mass spectra of nitrogen at pressures to 1 x 10^{-7} mm Hg was studied. The relationship between the ionic current intensities and the electron energies at m/e = 42 and 56 showed the mean potentials at which these peaks occur are 20.4 ± 1.3 and 46.5 ± 1 ev, respectively. The peak at 42 was considered to be the N_3^+ ion, the cross section of its formation is about 5 x 10^{-18} cm^2. The potential of the peak at 56 and of the double charged molecular ion $^{14}N^{15}N^{++}$ are close. Since there is no isotopic peak m/e = 57 it was concluded that N_4^+ is not formed, but that

Card 1/2

ACCESSION NR: AP4034581

the overcharged ion N_2^{++} is between the electric and magnetic fields of the mass spectrometer: $N_2^{++} + N_2 \longrightarrow N_2^{+} \; N_2^{+}$. The cross section of this process is 1×10^{-15} cm^2 and is independent of the electron energy from 50-100 ev. To study the excitation of the initial ions, the relative intensity - electron energy relationship at m/e = 7 was examined. This peak results from the decomposition of the N_2^{+} ion ($N_2^{+} \longrightarrow N^{+} + N$) resulting from collision with nitrogen molecules in the area between the electric and magnetic fields. The increase in relative intensity with increased electron energy up to 35 ev (above this value the relative intensity decreases) is interpreted as vibrational excitation of the primary ion N_2^{+}. Orig. art. has: 3 equations and 2 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physical-Chemical Institute)

SUBMITTED: 11Dec62 ENCL: 00

SUB CODE: IC, OP NO REF SOV: 002 OTHER: 009

EFENDIYEV, A.A.; CHERNEVA, Ye.P.; TUNITSKIY, N.N.; KARGIN, V.A.

Kinetics of ion extraction by polymeric complex-forming films.
Zhur. fiz. khim. 38 no.4:1035-1038 Ap '64. (MIRA 17:6)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.

ACCESSION NR: AP4025915 S/0056/64/046/003/0833/0839

AUTHORS: Laty*pov, Z. Z.; Kupriyanov, S. Ye.; Tunitskiy, N. N.

TITLE: Ionization collisions of electrons with ions and atoms

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 46, no. 3, 1964, 833-839

TOPIC TAGS: ionization, ionization collision, electron ion collision, electron atom collision, mercury, xenon, krypton, argon, neon, singly charged ion, doubly charged ion, electron impact ionization, secondary ionization cross section, mass spectrometer background ionization, metastable excited ion

ABSTRACT: This is a continuation of earlier investigations (ZhETF v. 45, 815, 1963) of the ionization of singly and doubly charged ions by electron impact. The method of intersecting ion and electron beam was used to measure the cross sections for single ionization of

Card 1/2

ACCESSION NR: AP4025915

the ions Hg^{+}, Xe^{+}, Kr^{+}, Ar^{+}, Ne^{+}, Hg^{2+}, Xe^{2+}, Kr^{2+}, and Ar^{2+}. The parent ions were obtained by ionizing the neutral atoms with a primary electron beam. The variation of the secondary ionization cross sections with the primary beam electron energy is determined. The ionization of neutral atoms by electron impact is found to be accompanied by formation of metastable excited ions with single, double, or triple charge. It is also shown that when the accelerating voltage is 2800 V, the background present in a mass spectrometer is due mainly to various ionization processes in which the metastable excited ions take part. Orig. art. has: 4 figures and 2 tables.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 14Sep63 DATE ACQ: 16Apr64 ENCL: 02

SUB CODE: PH NO REF SOV: 002 OTHER: 015

Card 2/~~4~~2

S/0056/64/047/002/0452/0454

ACCESSION NR: AP4043615

AUTHORS: Sumin, L. V.; Gur'yev, M. V.; Tunitskiy, N. N.

TITLE: Average momentum and energy of excitation of argon ions

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 2, 1964, 452-454

TOPIC TAGS: excitation, molecular physics, momentum transfer, ionization, mass spectrometry, argon

ABSTRACT: A method is described for determining the excitation energy of molecular ions, based on the measurement of the momentum transferred by the electron to the atom or to the molecule. This energy is in turn determined from the measured velocity acquired by the atomic or molecular ion. The positive ion velocity was measured with a mass spectrometer using the deflection method described by C. Berry (Phys. Rev. v. 78, 597, 1950). The experimental values of the momenta of several ions are presented, together with the cor-

Card 1/3

ACCESSION NR: AP4043615

responding excitation energies. For Ar^+ ions, the average energy transferred to the momentum by the ionizing electron turn out to be unexpectedly large, close to 50 eV. "The authors thank L. A. Vaynshteyn and I. I. Sobel'man for a detailed discussion of the results, and also V. G. Vasil'yev and S. Ye. Kupriyanov for many useful remarks." Orig. art. has: 2 formulas and 1 table.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 09Mar64

ENCL: 01

SUB CODE: NP

NR REF SOV: 002

OTHER: 006

Card 2/3

ACCESSION NR: AP4043615

ENCLOSURE: 01

Average momentum and excitation energy of several ions

1 Ион	Энергия электронов E_0, eV 2	$\bar{P}_x \cdot 10$[illegible], eV$^{1/2}$	J, eV
Ar^+	180	9,5±1	56±6
He^+	30	52±6	—
He^+	140	20±3	33±5
H_2^+	180	13±2	17,4±3
CH_4^+	90	4±2	10±5
$C_3H_8^+$	140	2±2	11±11

1 - Ion, 2 - Electron energy E_0, eV

Card 3/3

TUNITSKIY, N.N.; SPEZHAKOVA, G.Ye.

Effect of H^2 excitation on the cross-section of ionic-molecular reaction $H_2^+ + H_2 \rightarrow H_3^+ + H$. Kin.i kat. 6 no.3:563 My-Je '65. (MIRA 18:10)

1. Fiziko-khimicheskiy Karpova.

FOMIN, O.K.; TIKHOMIROV, M.V.; TUNITSKIY, N.N.

Surface ionization of toluene on oxidized molybdenum. Kin. i kat. 6 no.4:634-640 Jl-Ag '65. (MIRA 18:9)

1. Fiziko-khimicheskiy institut imeni L.Ya.Karpova, Moskva.

SPEZHAKOVA, G.Ye.; TUNITSKIY, N.N., TIKHOMIROV, M.V.

Ionic-molecular reactions in hydrogen and in a hydrogen-helium mixture. Zhur. fiz. khim. 39 no.8:2002-2008 Ag '65.
(MIRA 18:9)

1. Moskovskiy fiziko-khimicheskiy institut imeni Karpova.

L 15194-66 EWT(1)/EWA(h)/EWA(1) AT/GS/RM
ACC NR: AT5023428 SOURCE CODE: UR/0000/65/000/000/0015/0018

57

57

B+1

AUTHOR: Sumin, L. V.; Gur'ysv, M. V.; Tunitskiy, N. N.

ORG: none

TITLE: True mass spectra and kinetic energy of ions

SOURCE: Simpozium po elementarnym protsessam khimii vysokikh energiy. Moscow, 1963. Elementarnyye protsessy khimii vysokikh energiy (Elementary processes of the chemistry of high energies); trudy simpoziuma. Moscow, 1965, 15-18

TOPIC TAGS: mass spectrum, ion, kinetic energy, ion energy, electron energy

21,44,55

ABSTRACT: The problem of deviation of the actual mass spectra of ions from the corresponding true mass spectra is discussed. The larger the initial kinetic energy of an ion the greater its discrimination in the mass spectrometer. The relation between the ion energy distribution, determined from analysis of the line structure $\psi(E)$ and the initial ion energy distribution $\phi(E)$ is

$$\psi(E)=\frac{\mathrm{const}}{V_1V_2}E\varphi(E),$$

Card 1/3

L 15194-66
ACC NR: AT5023428

where V_1 and V_2 are the two dimensions characterizing the orifice of the mass spectrometer. The collection coefficient P is equal to

$$P = \text{const}\,\frac{f_0 k_0}{f_0 k_1 - f_1 k_0},$$

where f_0 and k_0 are experimentally determined peak areas for ion and molecule, respectively and f_1 and k_1 are initial points of the respective mass peaks. It was found that there is a significant discrepancy between the literature data on mass spectra of ions of organic compounds (e. g. *n*-hexane) ionized with 70 ev electrons and their true values. A partial mass spectrum of *n*-hexane considering the initial energy of ions is shown in fig. 1. Orig. art. has: 1 figure, 2 formulas.

L 15194-66

ACC NR: AT5023428

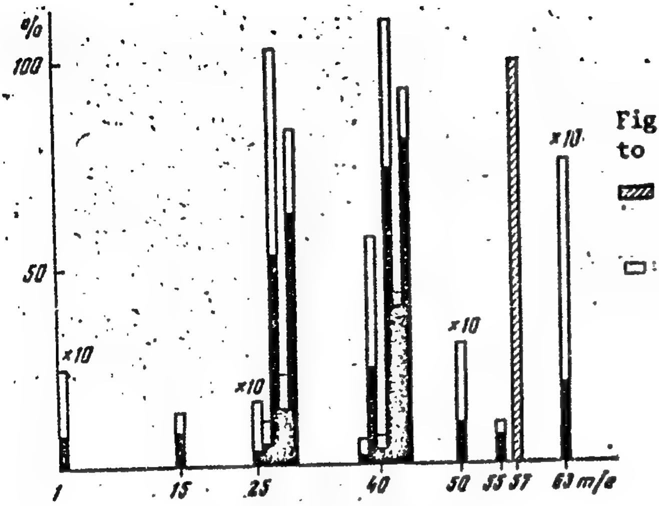

Fig. 1. ■ -mass spectra according to handbook

▨ -intensity of m/e = 57 line, assuming units of 100

□ -peak differential due to discrimination.

SUB CODE: 07 / SUBM DATE: 23Feb65/

Card 3/3

L 10842-66 EWT(1)/EWT(m)/T IJP(c) WW/GS/AT/RM

ACC NR: AT5023435 SOURCE CODE: UR/0000/65/000/000/0105/0109

58
B+1

AUTHOR: Tunitskiy, N. N.; 44,55 Bagdasar'yan, Kh. S. 44,55

ORG: none

TITLE: Processes of energy transfer in condensed system 21,44,55

SOURCE: Simpozium po elementarnym protsessam khimii vysokikh energiy. 44,55 Moscow, 1963. Elementarnyye protsessy khimii vysokikh energiy (Elementary processes of the chemistry of high energies); trudy simpoziuma. Moscow, 1965, 105-109

TOPIC TAGS: fluorescence, excited electron state, excited state, radiation effect

ABSTRACT: A mathematical treatment of the resonance mechanism of electronic excitation energy transfer is given. This mechanism operates during extinguishing of fluorescence of excited molecules B* by the acceptor molecules A, during sensibilized fluorescence of A molecules, during inhibition of chemical decomposition of B* by A, and during sensibilized photolysis or radiolysis of A molecules. For strong resonance type excitation energy transfer, the radius of the molecular interaction R depends only upon α and D where α is the energy transfer constant depending upon molecule orientation and D is diffusion constant. R is independent of molecular dimension. In general the magnitude of α is within 10^{-33}-10^{-31} cm^6/sec range and the magnitude of D is about 10^{-5} cm^2/sec; consequently, the magnitude of R is of the order

Card 1/2

L 10842-66 0

ACC NR: AT5023435

of 10^{-7} sec. The values of the effective molecular interaction radius R can be applied to the steady state process. If excitation energy transfer from B^* to A results in chemical transformation of A and concentration of A is sufficiently small, then the steady-state concentration of A molecules is expressed by $\frac{dv}{dt} = -Nv$.

Orig. art. has: 10 formulas.

SUB CODE: 20 SUBM DATE: 23Feb65/ ORIG REF: 004/ OTH REF: 000

Card 2/2 jw

KAMINSKIY, V.A.; TIMASHEV, S.F.; TUNITSKIY, N.N.

Form of chromatographic peaks. Zhur.fiz.khim. 39 no.10:2540-2546 O '65. (MIRA 18:12)

1. Moskovskiy fiziko-khimicheskiy institut imeni Karpova.

L 46188-66 EWT(m) DS/RM

ACC NR: AP6030600 (A,N) SOURCE CODE: UR/0413/66/000/016/0092/0092

INVENTOR: Cherneva, Ye. P.; Kargin, V. A.; Tokar', Ye. G.; Tunitskiy, N. N.

17 B

ORG: none

TITLE: Preparation method for a homogeneous ion-exchange membrane. Class 39, No. 185052

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 16, 1966, 92

TOPIC TAGS: ion exchange membrane, COPOLYMERIZATION, SULFONIC ACID, ETHYLENE, VINYL COMPOUND

ABSTRACT: An Author Certificate has been issued for a preparative method for a homogeneous polymeric ion exchange membrane, involving ultra-violet-initiated copolymerization of ethylenesulfonic acid derivatives with vinyl compounds, subsequent cross-linking of the copolymer, and fabrication of the film. The ethylenesulfonic acid derivative used is sodium ethylenesulfonate and the vinyl compound, acrylic acid; the components are copolymerized, the film is fabricated and then subjected to irradiation [unspecified]. [SM]

SUB CODE: 11/ SUBM DATE: 23Mar62

Card 1/1 fv UDC: 661.183.125:678.741-134.432:011:537.591

TUNITSKII, Z.

V.A. Degtiarev. Hero of socialist labor - V. A. Degtiarev. Moskva, Voen. izd-vo, 1941. 61 p. (Biblioteka krasnoarmeitsa) (51-48515)

UF620.D4T8

1. Degtiarev, Vasilii Alekseevich. 2. Degtiarev machine-gun.

Tupitsyn, I.F.

PHASE I BOOK EXPLOITATION SOV/4054

Akademiya nauk SSSR. Institut nauchnoy informatsii

Khimicheskaya promyshlennost' SSSR (The Chemical Industry of the USSR) Moscow, Goskhimizdat, 1959. 457 p. Errata slip inserted. 4,100 copies printed.

Sponsoring Agency: USSR. Gosudarstvennyy nauchno-tekhnicheskiy komitet.

Ed.: E. S. Rumm; Tech. Ed.: P. V. Pogudkin; Editorial Board: A. P. Vinogradov, S. I. Vol'fkovich, N. M. Zhavoronkov, M. I. Ivanov, V. S. Kiselev, I. A. Lunacharskaya (Scientific Secretary), S. S. Medvedev, S. D. Mel'nik, A. S. Plamevskiy, A. Ya. Ryabenko (Chief Ed.), and A. V. Topchiyev.

PURPOSE: This book is intended for the personnel of the chemical industry. It will be of interest to the general reader interested in the development and structure of the Soviet chemical industry.

COVERAGE: This book contains 13 articles on various aspects of the Soviet chemical industry. Among the developments in the production of raw materials for the manufacture of chemical products discussed are: 1) the use of raw materials synthesized from natural gas and petroleum to replace food products in the production of synthetic rubber, alcohol, detergents, etc.; 2) the production of acetylene from natural and petroleum gases for the synthesis of vinyl chloride, acrilonitrile, chloroprene, trichloroprene, 1, 4-butadiene, and other organic substances, based on methods developed by M. G. Kucherov, A.Ye. Favorskiy and others; 3) the production of acetylene from saturated hydrocarbons by cracking methane (and its homologs) at 1450° in an electric arc between two special electrodes in a gas reactor, by pyrolysis (thermal oxidation) of methane in an improved furnace designed by B. S. Grinenko, by high-temperature pyrolysis of propane and butane in tubular furnaces, or by other methods of producing acetylene for the production of synthetic rubber, ethyl alcohol, and other organic substances; 4) the synthesis of halogen derivatives of aliphatic hydrocarbons for the production of solvents, refrigerants, pharmaceutical products, etc., and 5) the production of rubber accelerators from nitrogen-containing aliphatic hydrocarbons. The history of plastics production in the Soviet Union is reviewed, and names, locations, and products of plants as well as the names of outstanding personalities in the field are given. The technical level and prospects of further development of different branches of the plastics industries are also discussed along with methods of manufacturing plastic articles. A special apparatus designed by Ye. M. Mogilevskiy and designated "VA" which permits preparation of viscose solution in one operation is discussed. It is being used to replace the complex, conventional equipment with great savings in space. General trends in the technology of synthetic fiber production are also discussed. A historical review of synthetic rubber production and the achievements of outstanding Soviet scientists in this field are given as well as names, locations and products of synthetic rubber plants. Rubber production and the manufacture of rubber goods are similarly reviewed. Statistical data and outstanding personalities in the development of the aniline dyes, paints and lacquers, mineral fertilizers, insecticides and fungicides, sulfuric acid, soda, mineral salts, radioactive and stable isotopes, and chemical reagents industries are given. Catalytic processes and automation and automatic devices used in the chemical industry are also discussed. Thirty-eight photographs included in the book show outside and interior views of some Soviet chemical industry plants, as well as their manufacturing, material-handling and laboratory equipment. Numerous personalities and facilities are identified in the body of the text. References accompany individual articles.

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Ul'yanov, N. S. The Chemical Mining Industry 302

Malin, K.M. Sulfuric Acid Production 314

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Bogachev, G.N. The Production of Mineral Salts 345

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Card 5/6

15

TUNIWSKAYA, V.F.

B-5

USSR/Crystals.

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18343

Author : V.F. Tunitskaya.
Inst : Institute of Physics, Academy of Sciences of USSR.
Title : Influence of Interaction of Activators on Luminescent Properties of CaS-Bi and Mn-Phosphors.

Orig Pub : Tr. Fiz. in-ta AN SSSR, 1956, 7, 107-158

Abstract : The activator Bi in the CaS-Bi phosphor produces only one radiation line of [illegible] mμ at 20°C. At 77.3°, this line decomposes into 2 systems of narrow equidistant lines depending on the influence of the lattice vibrations on the electron transitions. In the CaS-Mn phosphor, the luminescence of Mn is excited only in case of absorption in the basic lattice and the lines 312 and 366 mμ are not effective. In the CaS-(Bi, Mn) phosphor, Bi serves as a sensibilator, and these lines produce an intensive luminescence in the Mn band. The energy transfer takes place also

Card 1/2

USSR/Crystals. B-5

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18343

at low temperatures (-166°C). The absolute amount of the transferred energy rises with the temperature rise, with the rise of the excitation intensity and in case of irradiation with infrared light. The Bi line is extinguishing according a linear law with the rise of the Mn concentration. If small amounts of Mn were introduced, the total amount of light and the infrared flash increase considerably. At this phenomenon, the basic activator (Mn) influences the flash spectrum, and Bi influences the spectrum of the thermal de-excitation. A scheme of energy transfer by "induction resonance" analogous to the transfer in solutions is offered. It is concluded that the interaction of Bi and Mn in the CaS lattice results in a change in a greater part of the phosphor properties with the exception of the radiation and absorption spectra.

Card 2/2

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ACC NR: AP6013055 SOURCE CODE: UR/0048/66/030/004/0573/0580

AUTHOR: Arapova, E. Ya.; Levshin, V. L.; Mitrofanova, N. V.; Reshetina, T. S.; Tunitskaya, V. F.; Fridman, S. A.; Shchayenko, V. V.

58

ORG: Physical Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut, Akademiya nauk, SSSR)

55

B

21 21

TITLE: Luminescence mechanism and the band system of ZnS:Fe luminophors /Report, Fourteenth Conference on Luminescence held in Riga, 16-23 September 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 4, 1966, 573-580

TOPIC TAGS: crystal phosphor, luminescence, zinc sulfide, thermoluminescence, IR sensor

ABSTRACT: Although iron-activated zinc sulfide phosphors have been known since 1945, the nature of their luminescence mechanism is still obscure. The writers developed a synthesis procedure for ZnS:Fe phosphors in both powdered and sublimate form. The initial ZnS, containing less than 10^{-7} g/g iron, was mixed with the desired amount of Fe (none to 3×10^{-4} g/g) and heated at 1200° C for 90 min in a stream of HCl. Both the powdered and sublimated specimens proved to be sensitive to infrared. ZnS without Fe has one luminescence band peaking at 450 mμ; doping with Fe gives rise to another band peaking at 630 mμ; the intensity of this red band increases with the dopant concentration, while the blue band gradually weakens. Figures in the text show the lumin-

Card 1/2

L 26497-66

ACC NR: AP6013055 3

escence spectra at different Fe concentrations and the dependences of the intensities of the blue and red bands on the Fe content. Glow curves for the blue and red regions are also shown. Evaluations are made of the trap depth. The glow curve data are consistent with the results obtained in observing IR-stimulated flashes. A band schemei with two levels near the bottom of the conduction band and two levels or groups of levels near the valence band is proposed. Data on the infrared response are presented and discussed. It is suggested that the trapping levels responsible for IR-stimulated light flash may differ from the trapping levels responsible for the thermostimulated peak at 155°, even though both sets of levels are located at about the same depth, (0.06-0.07 eV). Aside from stimulation, infrared also proved to have a quenching effect, particularly in a certain frequency range. The authors are grateful to Z. M. Bruk, V. A. Minayeva and T. F. Filin for assistance in the work. Orig. art. has 9 figures.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 008/ OTH REF: 002

Card 2/2 LC

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no.6:9 Je '59. (MIRA 12:9)
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ryadovoy; SHAMIS, V., efreytor, radist 1-go klassa i 1-go razryada.;
TAŠKIN, Ya., kapitan; VASIL'YEV, P., master radiolyubitel'skogo
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